REMARKS

Applicant has reviewed the Office Action mailed on August 25, 2004 as well as the art cited. Claims 1-55 are pending in this application.

Telephonic interview

Applicant would like to thank the Examiner for the telephonic interview on November 10, 2004. The parties discussed the merits of the Office Action. The Examiner needed to confer with his supervisor before a decision was made on the matters discussed. However, the Examiner did not get a chance to speak to his supervisor and on November 24, 2004, contacted the Applicant and suggested that a response be filed. The following response incorporates the matter discussed during the telephonic interview.

Rejections Under 35 U.S.C. § 103

Claims 1-4, 6-9, 38-41, 44-53 and 55 were rejected under 35 USC § 103(a) as being unpatentable over Hshieh (U.S. Patent No. 6,172,398) in view of Muller et al. (Device Electronics for Integrated Circuits).

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP 2143

Independent rejected Claims 1, 38 and 50 are as follows:

Claim 1

1. (Original) A method of forming a MOS device in an integrated circuit, the method comprising:

forming a body region in a substrate adjacent a surface of the substrate;

forming a source in the body region; and

forming a layer of narrow band gap material adjacent the surface of the substrate, the layer of narrow band gap material having a band gap narrower than a band gap of the substrate material, wherein at least a portion of the source is within the layer of narrow band gap material.

Claim 38

38. (Original) A method of forming a lateral DMOS for an integrated circuit, the method comprising:

forming a body of a first conductivity type in a substrate of a first conductivity type with a low doping density, wherein the body is positioned adjacent a surface of the substrate;

forming a layer of narrow band gap material on the surface of the substrate adjacent the body, wherein the layer of narrow band gap material has a band gap that is narrower than the band gap of the body; and

forming a source of a second conductivity type with a high doping density in the body, wherein at least a portion of the source is formed in the layer of narrow band gap material, further wherein the narrow band gap material suppresses carrier injection from the source into the body thereby reducing parasitic HFE.

Claim 50

50. (Original) A method of forming a vertical DMOS comprising:

forming a drain region in a substrate of a first conductivity type with a low dopant density;

forming a body region in the substrate of a second conductivity type over the drain region;

forming a layer of narrow band gap material in the substrate, wherein the layer of narrow band gap material has a narrower band gap than portions of the body region;

forming at least one source region of the first conductivity type with high dopant density in the body, wherein at least a portion of each source region is formed in the layer of narrow band gap material; and

forming at least one gate.

As indicated above, independent Claims 1, 38 and 50 are rejected under section 103 as being unpatentable over Hshieh (U.S. Patent No. 6,172,398) in view of Muller et al. (Device Electronics for Integrated Circuits). Neither the Hshieh nor the Muller teach or suggest the use of a narrow band gap material as is disclosed and is claimed in independent Claims 1, 38 and 50 of the present application.

The Examiner stated in the Office Action that the narrow band gap material was not clearly taught in the Hshich reference. The Examiner further took "official notice that such a band gap is known in the art" using the Muller reference. However, the Muller reference section cited by the Examiner merely describes some semiconductor material properties. The Muller reference does not suggest placing narrow band gap material in any part of a transistor. In fact, the Muller reference does not suggest the use of narrow band gap material for any purpose, yet alone for using it to reduce parasitic transistor action when placed as required in the independent Claims 1, 38 and 50 of the present invention.

During the telephonic Interview, the Examiner had asserted that some of the material regions in Figure 3A of the Hshich reference may be considered "narrow band gap material" that meet the limitations of the claims in the present application. However, as stated above, the Examiner correctly acknowledged in the Office Action that the Hshieh reference does not teach the use of narrow band gap material as it is claimed in independent Claims 1, 38 and 50. Moreover, there is no suggestion in the Hahieh reference to use a layer of narrow band gap material having a band gap narrower than substrate material (as in Claim 1) or the body (as in Claim 38) or the body region (as in Claim 50). In addition, each of the independent Claims 1, 38 and 50 includes the aspect that at least a portion of the source within the layer of narrow band gap material. The Hshieh reference does not teach or suggest at least a portion of a source in a layer of narrow band gap material. Accordingly, the Applicant respectfully traverses the Examiner's rejection of Claims 1, 38 and 50 under Section 103.

Therefore, the Applicant respectfully requests the withdrawal of the rejection of independent Claims 1, 38 and 50 under Section 103. Moreover, since dependant claims 2-4, 6-10, 39-49, 51-53 and 55 depend from and further define their respective patentably distinct

independent claims, the Applicant also respectfully requests the withdrawal of the rejection of these dependant claims. Moreover, since the Applicant believes these claims are allowable for the above reasons further responses to all rejections may not have been put forth in this response. The Applicant, however, retains the right to address said rejections if a further response is required.

Allowable Subject Matter

Claims 5 and 54 were objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 11-37 are allowed.

CONCLUSION

Applicant respectfully submits that claims 1-55 are in condition for allowance and notification to that effect is earnestly requested. If necessary, please charge any additional fees or credit overpayments to Deposit Account No. 502432.

If the Examiner has any questions or concerns regarding this application, please contact the undersigned at 612-455-1690.

Respectfully submitted,

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